



2015 Annual Report



- A Note from Our Executive Director **P.1**
- Our Team **P.2**
- Fiscal Review **P.2**
- Solid Waste Highlights **P.3-4**
- Water Operation Highlights **P.5-6**
- Wastewater Operation Highlights **P.7**
- Water & Wastewater Highlights **P.9-10**
- Facilities Highlights **P.11**

Union County
Department of
Public Works

Our mission
is to:

Plan,
design and
maintain
Union County's
essential
services and
infrastructure to
ENHANCE our
community's
everyday life.

A Note From Our Executive Director

Dear Union County,

I get asked a lot about what we do as Union County Public Works. Well, in summary it's our responsibility to assure that all of our residents can say:

- I have a safe and constant water supply to meet all of my needs.
- My home's sewer is working well each and every day.
- I have a safe and convenient location to drop off my garbage and recycling items.
- Public Works effectively plans, constructs and maintains the facilities used by Union County employees and citizens in conducting the business of the County.
- If I have a problem, Public Works takes care of it right away.
- My county is making environmentally-sound decisions that prepare for our community's growth and development.
- I'm proud to live in Union County.

Needless to say, I couldn't make those promises if I wasn't surrounded by an amazing group of people. We have 120 people in Public Works that are committed to making each one of those statements a reality. I promise you this, on behalf

of a dedicated team, that we do not take our responsibilities lightly and we are steadfast in helping make Union County a better community.

Our goal isn't to meet our residents' expectations, but rather to exceed them. For us to do that, we have to embrace new technology, expand our skills and proficiencies, and stay ahead of a constantly-changing infrastructure. The good news is that we've been doing this for years, and it's exactly what has allowed Union County to develop into the community that it is today.

We appreciate your trust and confidence in Union County Public Works and we look forward to serving you for years to come.

Sincerely,
Ed



Ed Goswicki
Executive Director
Union County
Department
of Public Works

Union County Public Works Leadership Team



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Union County Public Works has 120 people that work to provide water supply, wastewater treatment, solid waste management, and facilities management services to the unincorporated and many of the incorporated areas of Union County.

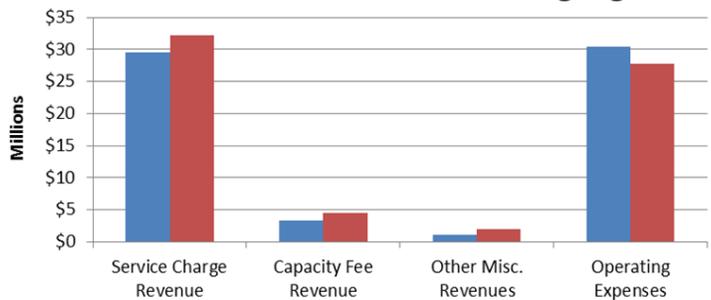
Fiscal Performance

Union County Public Works has three separate funds for each of the major service areas. The Water and Wastewater Fund and the Solid Waste Fund are both enterprise funds. In other words, these two areas operate as independent “businesses”, each generating its own revenue from customers receiving services. Ad-valorem tax revenues are not used to fund enterprise funds. The Facilities Fund is an internal service fund which simply means this department provides services and generates revenue internally (through other County departments) and is a break-even operation.

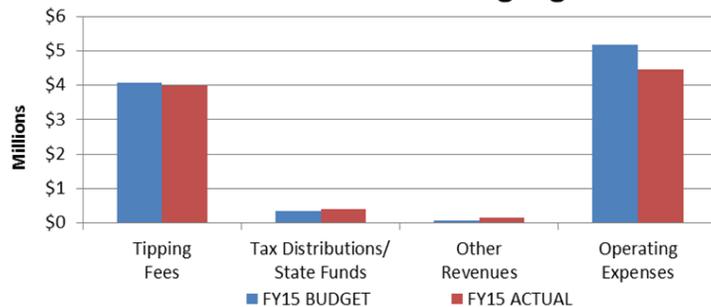
In FY2015, the Water and Wastewater fund generated nearly 15% more revenue from service charges than the prior year. The Water and Wastewater department generated \$38.7 million in total revenues last year while keeping annual operating expenditures under budget expending only \$27.7 million. Excess revenues are primarily used to pay debt and fund major capital projects.

The Solid Waste fund generated approximately \$140,000 in net revenue for FY2015. Although Construction & Demolition revenue increased more than 40% over the prior year, all other Solid Waste program revenues decreased in FY2015. Annual operating expenditures were essentially the same as the prior year; although a larger portion of FY2015 expenditures went toward much needed improvements at the Solid Waste Management Facility and convenience sites.

Water & Wastewater Financial Highlights



Solid Waste Financial Highlights





HHW COLLECTION DAY

Our Solid Waste division held a Household Hazardous Waste (HHW) Collection Day on Saturday, April 25, 2015, at the Church Street Parking Lot, beside the Seaboard Train Station.

Over 600 residents dropped off products, such as paints, cleaners, oils, batteries and pesticides, that contain potentially hazardous ingredients and require special care when disposing of them. Their efforts helped keep hazardous materials out of our landfills and protect our groundwater.

The overwhelming response from our residents that day was, ***“Thank you for doing this and please do it again.”***

This was by far the largest volume of recycling performed for a one-day HHW event. We appreciate everyone’s efforts and look forward to doing it again soon.



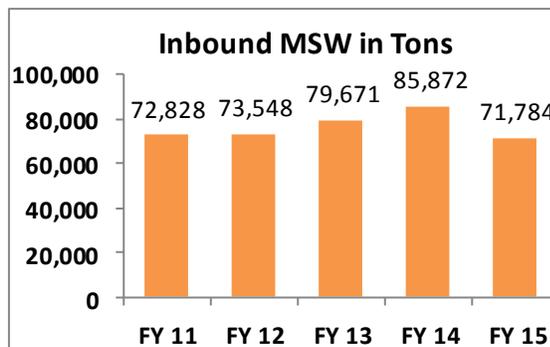
Solid Waste Highlights

Our Solid Waste Management Facility (SWMF) and its associated team have worked extremely hard this year to make some long awaited improvements in operations, compliance, facility management and customer relations. There were many technical and operational challenges that were identified early in the year, such as improving landfill soil cover efficiency and compaction, appropriate landfill slope and tipping floor management. We also upgraded all storm water detention and conveyances, redesigned our composting site operations at the SWMF and other general maintenance at our convenience center sites.

Municipal Solid Waste

Municipal Solid Waste (MSW) volume, more commonly known as trash or garbage, declined in 2015, largely due to one of Union County Public Work’s major MSW customers going out of business. Losing its share of MSW was the chief contributing factor to the drop in volume from FY 2014 to FY 2015.

Focused customer outreach and improved economic conditions have poised MSW volumes to rebound from 71,784 tons in 2015 to a projected 75,380 tons in FY 2016, with the most recent tonnages being 6,878 tons in June, 6,804 tons in July and 6,424 tons in August with more growth on the way. Our convenience center sites reported a price per ton increase from an average of \$149.59/ton in 2015 to \$156.31/ton in the first quarter of FY16.



2015 Solid Waste Management Facilities Improvements



Left to Right: storm water Improvements, new convenience center hut, upgraded waste oil tank collection



Solid Waste Highlights

Composting

Composting is the natural decomposition of organic materials into a nutrient rich soil amendment. The main composting amendments used in the process at our Type I facility are yard waste materials such as grass clippings, leaf mulch, tree limbs and land clearing debris.

On-site grinding will produce a variety of mulch products that may even include dyed hardwood mulch for landscape beautification.

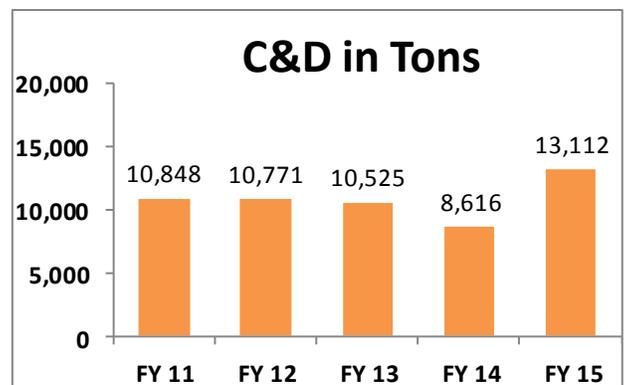


As finished compost and mulch is generated at our site, our customers will be able to buy these products at a very reasonable price for use in landscaping around trees and natural areas and soil amendment/potting mix for raised beds and organic gardens.



Construction and Demolition

Increased construction in Union County, including the new U.S. Highway 74 Bypass, along with improved customer outreach regarding the Solid Waste Management Facility's services, have led to significantly higher Construction and Demolition (C&D) landfill tons. C&D has risen to an annual volume of 13,112 tons through June of 2015, with 1,521 tons in June, 1,505 tons in July and 1,885 tons in August.



In 2015, we addressed concerns to our C&D landfill, such as lack of cover material, slope maintenance, and improvements to our draining system. In addition, new operating provisions were initiated that allowed us to operate more efficiently by isolating our fill sequence within the landfill. Our team has worked extremely hard to change the "landscape" and make improvements, all of which were recognized in our annual North Carolina Department of Environment and Natural Resources (NCDENR) Solid Waste Inspection in July of this year.



C&D landfill operations and cover improvements

Transfer Station

Numerous improvements have been made to our transfer station that receives solid waste from our customers, including a new concrete tipping floor in our MSW Transfer Station and new paint on our metal shop at the SWMF. Improvements have also been made at four of our convenience center sites. In addition, operational improvements to all waste oil tanks were initiated by re-positioning the tanks on pavement under newly purchased canopies in order to meet all storm water requirements.

Where It All Begins

The primary source of water for Union County is the Catawba River. Union County jointly owns and operates the Catawba River Water Treatment Plant with the Lancaster County Water and Sewer District in Lancaster, SC. Currently 80% of our water needs are met through this facility.

The Catawba River was originally home to the Catawba Indian Tribe, self-identified "people of the river."

The headwaters of the Catawba River extend from the slopes of Grandfather Mountain, near Blowing Rock, to the mountains near Ridgecrest, North Carolina. The basin includes approximately 5,000 miles of waterways and it includes portions of 24 counties in two states (North Carolina and South Carolina). It also includes one National Wilderness Area (Linville Gorge), a National Park (Congaree National Park), the Catawba Indian Reservation, and many state and local parks.

Catawba River Facts:

Length:

217 miles

Source:

Blue Ridge Mountains

Mouth:

Wateree River

Cities:

Charlotte, Rock Hill, Catawba, Morganton, Hickory, Asheville, Great Falls, Rhodhiss

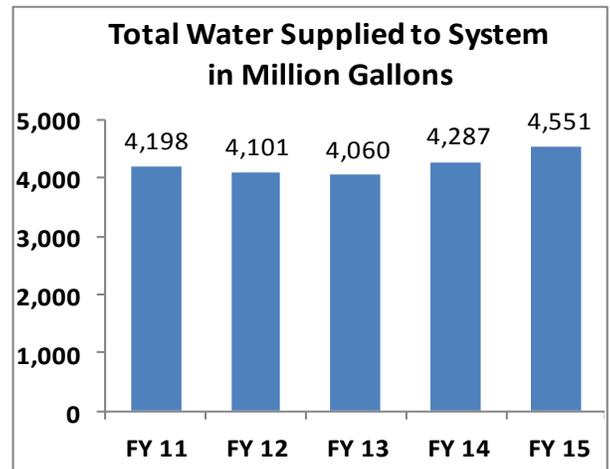
Bridges:

Buster Boyd Bridge, Sloans Ferry Bridge



Water Operation Highlights

The existing County water main network contains pipes ranging in size from 2 inches to 42 inches in diameter. There are over 1,000 miles of pipe in the system with more than 6,000 fire hydrants which serve over 45,000 customers. The system is divided into five different pressure zones to assure that the pressure of the water delivered our customers stays within acceptable ranges. System performance relies on five booster pumping stations, which pump water to six elevated storage tanks that maintain the system pressures within these zones.



Ice Pigging

To improve water quality in a specific section of the water distribution system between Wingate & Marshville, UCPW performed a procedure known as "ice pigging" during the month of June 2015. The process scours the inside of the water pipes by injecting an ice slurry which removes significant sediment and tuberculation from the pipes and improves water quality.

The distribution area selected is a dead-end area of the system and routinely has water quality issues and required frequent flushing. After ice pigging was completed, the water quality improved and follow up tests have demonstrated a maintained water quality and minimal "complaint" flushing.



Ice slurry exiting the hydrant



Samples of the water quality before and after the sediment was removed



Did you know?

“Manhole covers” started off as slabs of stone or pieces of wood allowing access to covered trenches that carried sewage. This basic design was in use from 3500 BCE through the 1750s-1850s CE. In the nineteenth century, modern manholes and the modern manhole cover were developed. For the last 200+ years, iron works in the United States have made cast-iron manhole covers, some weighing as much as 300 lbs. each, some rectangular, some square, but for the most part, round. The oldest available foundry catalog for manhole covers dates back to 1860.

Not a whole lot has really changed in the years between the 1870s and now relative to the philosophy of manhole design, though materials and installation techniques have changed. The early designers had an amazingly good sense of what was needed.

Water Operation Highlights

Free Chlorine Burnout

During February, March and April 2015, Union County Public Works (UCPW) worked in cooperation with Catawba River Water Treatment Plant, Lancaster County Water & Sewer District and Anson County to perform a system-wide free chlorine burnout to improve water quality.

Since 2009, water supplied by Union County’s joint-venture water plant has been treated with chloramines. As a part of a regular maintenance program, the water plant temporarily switched to free chlorine for about one month and began moving water into the distribution system as a maintenance activity to optimize the water quality of the distribution system. The burnout helped to remove any accumulations on the system’s pipes and preserve taste.

Valve Maintenance

UCPW completed a three-year valve exercising program this year and wrapped up exercising 16,000+ valves in the water distribution system. Benefits of this program are:

- accurate records of detailed valve information
- valve reliability in emergencies
- the ability to immediately isolate main breaks, resulting in lower water losses and the least possible disruption of service to customers
- extended valve life
- less employee time spent dealing with emergency repairs and more confidence in the system

Crews located, cleaned out, repaired lids and risers, and operated over 16,000 valves. This work has generated over 800 additional work orders to excavate, repair and/or replace valves. Of the 16,000+ valves, an estimated 25% received some form of repair while crews were on site (lid replacement, cleanout, light excavation, valve box realignment, etc.).

Early “Roots” of Sewers

3200 BCE Scotland

- First lavatory-like plumbing systems were fitted into recesses in the walls of homes — with drained outlets.
- Certain liquid wastes drained to areas either under or outside of buildings/homes.

4000 – 2500 BCE Babylonia – Mesopotamian Empire

- Had stormwater drain systems in the streets; drains were constructed of sun-baked bricks or cut stone. Some homes were connected.
- Origin of the earliest known pipe: Babylonia was documented by many as one of the first places to mold clay into pipe (via potter’s wheel). Tees and angle joints were produced and then baked to make drainage pipe, all as early as 4000 BCE.



Knee and T Joint, made about 4,000 BCE. Found in Mesopotamia



Water Facts

On average, a person uses about 100 gallons of water a day, but only drinks about a half gallon per day.

Nearly 97% of the world's water is salty or otherwise undrinkable.

Another 2% is locked in ice caps and glaciers.

That leaves just 1% for all of human use - agricultural, residential, manufacturing, community, and individual needs.

Running the water while brushing your teeth wastes up to 4 gallons a minute.

The bathroom is the room in the house where most water is used. (The toilet is the number one water-using appliance in the home).

1.5 to 7 gallons of water are used to flush a toilet.

A five minute shower takes 10 to 25 gallons of water.

An automatic dishwasher uses 9 to 12 gallons of water to wash one load.

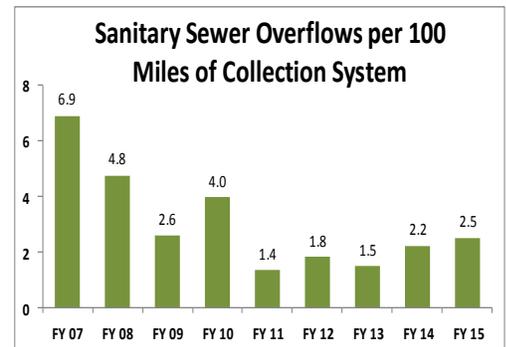
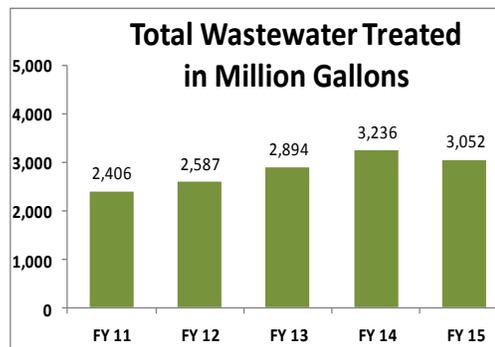


Wastewater Operation Highlights

Sewer Operation

Wastewater generated by our 33,000 customers is conveyed through a collection system comprised of over 540 miles of gravity lines with pipe diameters ranging from 4 inches to 48 inches. There are also more than 70 pump stations in the system, with over 70 miles of force mains that pump wastewater to our treatment facilities in areas that will not flow by gravity.

The County currently owns and operates five wastewater treatment plants within the County, currently termed Water Reclamation Facilities (WRF). The Facilities each treat wastewater from a specific drainage areas within the County. Union County currently has a total of 8.2 million gallons per day (MGD) of wastewater treatment capacity with these facilities and contracts with the Cities of Monroe and Charlotte for an additional 5.65 MGD of treatment capacity to serve eastern Union County and the Six-mile Creek basin respectively.



FOG Program

In North Carolina, over 1/3 of sewer backups come from FOG, or fat, oil and grease, that gets dumped down the drain. When FOG enters the sewer system, it cools and hardens, clinging to pipe walls. Over time it builds up and causes blockages, which could cause damage to homes, business or the environment. UCPW has begun a FOG control and awareness program for residents and restaurants to minimize FOG-related blockages. The residential program involves an updated website, video tutorials and public outreach. For restaurants, UCPW has administered new grease-disposal restrictions and will be administering inspections at each establishment to ensure compliance.





Water & Wastewater **Highlights**

The Union County Public Works Department (UCPW) operates and maintains a regional water utility system that provides retail water and wastewater service to over 45,000 water customers and 33,000 sewer customers located throughout unincorporated Union County and 13 of the 15 municipalities within. Union County UCPW currently meets the water and wastewater needs of more than one half of Union County's population (by 2010 census estimate). UCPW also provides wholesale water supply to the Town of Wingate and also has a water sales agreement with the City of Monroe to sell up to 2 million gallons per day to the City as part of their long term water supply strategy.

New Operations Center



Construction is nearly finished on the redevelopment of the Operation Center for the Water & Wastewater Division. Project elements include a new Administration Building including a Staff Support and Training Facility, a new Warehouse, Vehicle wash, renovation of two existing buildings and demolition of various existing structures on site. Also included is the development of all required infrastructure on site including a new entrance, water, sewer, power, parking and storm water management. Total construction cost is \$7.9 million dollars. The project should be completed in December 2015.

Weddington Water Tower

A new water tower is being constructed in Weddington, NC to provide more consistent, sustainable water pressure for approximately 7,200 customers and their families in the Weddington and Marvin areas.

The project, which features a new 1.5 million gallon, 170-foot tall, elevated water tank located on Hemby Road and a new booster pump station located on Providence Road, is on target for completion in May 2016.

Construction on the tower's water main piping, foundation and concrete shaft have been completed. The water tank has been erected on the ground and is scheduled to be raised in December. It will become fully operational when the pump station is completed in May.

The combined construction cost to complete the two projects is \$6.9 million.



Representation of completed Weddington water tower



2015 Progress

Union County saw continuing growth this past year in both the water distribution and wastewater collection systems. In 2015 we've added:

New water customers
1,267

New sewer customers:
1,091

New miles of water main:
27

New miles of sewer main:
20

New fire hydrants:
98

The County is expected to grow to twice its current population by the year 2050.

It's our responsibility to prepare for ensure Union County's water supply and wastewater treatment needs, as well as to protect stream flows and watersheds.



YRWSP Project Timeline

2015
2016
2017
2018
2019
2020
2021



Interbasin Transfer (IBT) Certificate



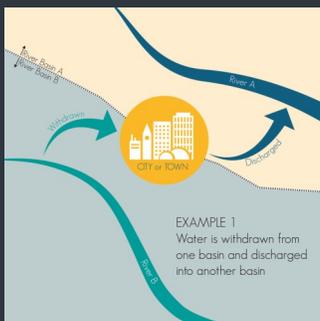
Design/Permitting



Construction

What is an IBT Certificate?

An interbasin transfer is the movement of surface water from one river basin into another. Transfers that exceed 2 million gallons per day (MGD) average daily, or 3 MGD maximum daily, require an IBT certificate. The Environmental Management Commission is the unit responsible for approving or denying requests for IBT certificates.



Water & Wastewater Highlights

Yadkin River Water Supply Project

We know we need more water to meet the needs of our growing community. We want to make sure the solution we choose balances cost while minimizing impacts to the things that are important to each of us - the health of our environment, the vibrancy of our recreational opportunities, and the sustainability of our water supply.

The County carefully considered a wide range of potential alternative solutions to securing a long-term, sustainable water supply for our growing community. One alternative stood out among the rest because of its benefit, environmental impact, and long-term feasibility.

The Yadkin Regional Water Supply (YRWSP) project is a collaborative effort between Union County and the Town of Norwood, in Stanly County, to provide a new water supply source to Union County's Yadkin River Basin residents and new infrastructure to the Town of Norwood. The project addresses how to meet our growing population's demand for water from 2020 and beyond.

This project will include a new water intake and pump station in Norwood to access Lake Tillery and a 21-mile pipeline to bring that water to Union County residents in the Yadkin River Basin.

In January 2015, the County submitted an 830-page Environmental Impact Statement to the Department of Environment and Natural Resources (now the Department of Environmental Quality). The document is a major step in the pursuit of an Interbasin Transfer (IBT) certificate from the Yadkin River. The IBT certificate process began in June 2013 and the County is expected to receive the certificate by the end of 2016.

The initial construction phase of the project is currently estimated to cost \$138 million and will include water intake and pumping infrastructure, water transmission piping from Lake Tillery to Union County and a new water treatment facility within Union County.

Once the IBT certificate is issued, Union County and the Town of Norwood will continue additional permitting and design efforts. Construction is anticipated to begin in early 2019. The water treatment facility is expected to be operational by early 2022 and will serve Union County and the Town of Norwood residents for years to come.

Project Benefits Include:

- Long-term water supply for residents
- Reduced dependency on the Catawba River
- Infrastructure funding for Norwood



After careful consideration, the proposed solution was chosen because it:

- Can supply the 28.9 MGD needed for current and future needs.
- Is one of the lowest-cost alternatives and is a financially feasible option for this water supply.
- Has less impact on lake aesthetics, other water needs, and hydropower than the other alternatives.
- Has similar environmental impact, or significantly less, than the other alternatives.



Water & Waste Water Highlights

12 Mile Creek WRF

The County is in the process of expanding its Twelve Mile Water Reclamation Facility (WRF) to handle growth in western Union County. The WRF is a state-of-the-art plant that treats wastewater by removing ammonia, bacteria, BOD, nitrogen, phosphorus, TSS and viruses. The Facility will expand its capability to handle 6.0 million gallons per day (MGD) to 7.5 MGD, but also has been permitted to expand up to 12.0 MGD in the future. This first expansion, currently under design, is anticipated to cost \$34 million and will begin construction in the summer of 2016. The new treatment units are expected to be operational by the beginning of 2019.

Short Line Water Extension

Since 2012, Union County Public Works (UCPW) has offered its residents funding assistance to connect to the County water system. The program started July 1, 2012 and recurs July 1st of every year.

Funding assistance is limited and applies to the first 1,000 linear feet of pipeline needed to connect to the County water system. If more than 1,000 linear feet of pipeline is required for the connection, it will be paid by the property owner, except in situations where a documented health hazard exists. All property owners who participate in this program will also be responsible for payment of tap and capacity fees.

UCPW received 24 new applications, serving 49 residents in FY2015. This represented approximately 44,000 linear feet of water line extensions. Based on an estimated \$35/linear foot, the total project cost equaled over \$1,500,000. With funding set at \$500,000 per year, the program has an additional three-year back log of projects. Construction was completed for the next seven applicants in November, 2014.

Capital Improvement Program

UCPW is responsible for the management and implementation of those capital improvement projects necessary to maintain and expand our water and wastewater utility system to meet the current and future needs of our customers. UCPW funds the capital improvement program from rates and fees charged to our customers.

The adopted six-year Public Works Capital Program (PWCP) is largely based on the Comprehensive Water & Wastewater Master Plan completed and approved by the Board of County Commissioners. It includes 57 projects with a total budget of \$325,740,750 for projects from FY2015-FY2020. The Comprehensive Plan provides a twenty-year projection of system needs based on current population growth trends (2.4 percent during the planning window) population distribution trends, and historical demand data, among a number of other factors. The adopted PWCP addresses the water and wastewater system needs for improvement, expansion, maintenance, rehabilitation, and renewal. The six-year plan balances the system expansion needs and the ongoing maintenance needs, while ensuring the capacity and affordability of the system.

Did you know?

Environmental awareness and activism is not a present-day concept.

In the mid-1700s Benjamin Franklin and others petitioned the Pennsylvania Assembly to stop dumping waste and attempted to regulate waste disposal and water pollution.

In 1855, Chicago became the first U.S. city with a comprehensive sewer plan, and all U.S. towns with populations over 4,000 had city sewers by 1905.

In 1899 the Refuse Act prevented some obvious pollution of streams and placed the U.S. Army Corps of Engineers in charge of permits and regulation.

In 1914 U.S. government agencies began pollution surveys of streams and harbors. Reports filed by the early 1920s showed heavy damage from oil dumping, mine runoff, untreated sewage, and industrial wastes.

In 1924 the Oil Pollution Control Act prohibited discharge from any vessel within the three-mile limit, except by accident.

In 1948 the Federal Water Pollution Control Act and active House and Senate Public Works Committee in water pollution came about.

In 1956 Congress passed the Water Pollution Control Act, in 1961 the Clean Water Act, and in 1965 the Water Quality Act, setting standards for states.

In 1970 Congress and the president established the EPA.

In 1972 Congress passed the Federal Water Pollution Control Act (the "Clean Water Act").

In 1973 EPA issued the first NPDES permits.

In 1974 Congress passed the Safe Drinking Water Act.





Properties Managed by Facilities Division

- Adult Probation Center
- Ag Center
- Animal Shelter
- Farmers Market
- Government Center
- Group Home
- Judicial Center
- Main Library
- Union West Library
- Waxhaw Library
- Marshville Library
- Historical Courthouse
- Historical Post Office
- Patton Avenue Central Warehouse and Fleet Management
- UCPS Building
- Union Village



Facilities Highlights

Our Facilities Division of Union County Public Works (UCPW) provides day-to-day maintenance, repair, modernization, and improvement services to all of our county-wide facilities. This includes building management, renovations, construction, space planning and allocation, grounds management, janitorial services, building operations, security, and environmental compliance. There are 16 buildings that the Facilities Division oversees.

The Facilities Division continued its progress on the new Human Services building, which is set for completion in 2017. Approximately 20 acres were acquired for the project on Concord Highway. The new facility will house Social Security, Health and Human Services for Union County.

Plans have begun for a new firing range to be used by the Union County Sheriff's Office. The brand new facility will be located on Mills Harris Road and is slated to open in the fall of 2016. The building plans have been drafted and construction will begin next year. The new firing range will save our officers time and resources, which are being spent in their commute to the current facility in Cabarrus County.

New Construction



Representation of the new Union County Sheriffs Office firing range



Renderings of the future Human Services building set for completion in 2017